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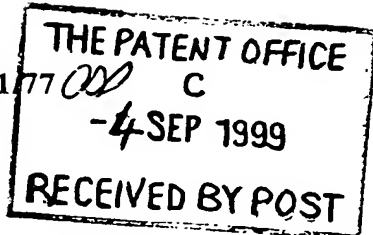
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Dated 12 September 2000

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Request for grant of a patent

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1	Your reference	SPG/P36102	
2	Patent application number	9920839.9	
3	Full name, address and postcode of the applicant	Innovata Biomed Limited 60 London Road St Albans AL1 1NG	
	Patents ADP number	04047130003	
	State of incorporation	England and Wales	
4	Title of the invention	INHALER	
5	Name of agent	Harrison Goddard Foote	
	Address for service	Belmont House 20 Wood Lane Headingley Leeds LS6 2AE	
	Patents ADP number	14571001 ✓	
6	Priority applications	Country	Priority App No
			Date of Filing

INHALER

This invention relates to a novel form of inhaler. In particular the invention provides a novel form of dry powder inhaler.

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Dry powder inhalers are known, such as TECHNOHALER, produced by Innovata Biomed in the UK. Such a device is described in International Patent Application No WO 93/16748 (PCT/GB93/00335). WO '748 describes an inhaler which comprises a disc like magazine having a plurality of medicament carrying receptacles around its periphery. Each receptacle comprises a spool housed in a spool carrier. Each spool has a flange at each end which form a tight slidable fit within the body of the spool carrier. The space left between the body of the spool and the spool carrier is filled with an appropriate medicament.

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15 The known TECHNOHALER is provided with suitable indexing means, including a push button and a ratchet mechanism which engages with the upper surface of the disc. Depression of the push button urges a push rod to push the spool, which is adjacent the inhalation passage of the inhaler, downwards and almost fully out of the spool carrier, and into the inhalation passage. As the spool is pushed into the inhalation passage, it carries with it the measured quantity of medicament which it has been used to contain inside the magazine. The user can then inhale through the mouthpiece so as to take up the drug now released into the inhalation passage. The upper flange of the spool remains, however, held by the lower part of the receptacle. When the user then releases push button, the ratchet mechanism causes the disc to rotate by one step so that the next receptacle is brought into register with the inhalation passage. The inhaler is thus reset and ready for delivery of another dose of drug. The "empty" spool not having been pushed fully out of the first receptacle, continues to move round with the first receptacle, supported by the lower guide.

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When the metering member is in the medicament retaining position it is preferably out of communication with the inhalation passage and whilst the metering member is in the medicament dispensing position it is preferably in communication with the inhalation passage.

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The metering member is of such dimensions as to be able to pass into the inhalation passage. The metering member will preferentially comprise those described in WO 93/16748. Thus, in a preferred embodiment the metering member will comprise a spool housed in a spool carrier. The spool carrier acts as a conduit for the spool to communicate with the inhalation passage. Thus the spool will be provided with a flange at each end such that the flanges are in sealing engagement with the inner walls of the conduit and a space exists between the inner walls of the conduit and the non-flanged portion of the spool. In the filled metering member, the space is taken up by a measured dosage of medicament. Indeed, the plug, flanges and conduit are so dimensioned so as to predetermine the amount of medicament available.

The spool and spool carrier is generally that described in the prior art patent application. However, instead of the spool being mounted in a vertical position each spool is essentially horizontally mounted. For the sake of clarity, the spools are positioned in the same plane as the plane of the disc magazine. The push rod used to eject the spool from the spool carrier therefore operates radially from the centre of the disc and does not push the spool out of the disc plane.

The push rod mechanism is substantially similar to that known conventionally save that it acts radially.

As hereinbefore described a significant advantage of the device of the invention is that it can be used to deliver combination therapies if desirable.

Increasingly, patients are required to take more than one medicine and this is no less the case in the treatment of bronchial disorders. Thus, for example, combination

beclomethasone dipropionate, fluticasone, budesonide and flunisolide; and combinations thereof.

Specific combinations of medicaments which may be mentioned include combinations of steroids, such as, beclomethasone dipropionate, fluticasone, budesonide and flunisolide; and combinations of to β_2 -agonists, such as, formoterol and salmeterol. It is also within the scope of this invention to include combinations of one or more of the aforementioned steroids with one or more of the aforementioned β_2 -agonists. A specific combination which is preferred is a combination of fluticasone and salmeterol.

When dual disc magazines are used the inhaler will be provided with two radially acting push rod mechanisms. These mechanisms may be adapted to operate together, independently or sequentially.

The invention will now be illustrated by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a cross-sectional view of a spool and spool carrier;

Figure 2 is a perspective view of a single disc magazine comprising spools;

Figure 3 is a schematic representation of the ejection of a spool from the spool carrier;

Figure 4 is a perspective view of a combination therapy disc magazine; and

Figure 5 is a cross-sectional view the combination therapy mechanism.

With reference to Figure 1. A single medicament dose unit (1) is comprised of a spool (2), a spool carrier (3) and a single dose of medicament (4), for use in a dry powder inhaler. The spool (2) comprises a longitudinal body (5) and terminal flanges (6 and 7) at each end. The sides (8 and 9) of the flanges (6 and 7) form a seal and a tight slidable fit with the inner walls (10 and 11) of the spool carrier (3). The length of the spool (2) and the length of the spool carrier (3) are substantially the same. Each flange is provided with an external face (12 and 13).

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CLAIMS

1. A dry powder inhaler comprising a metering member adapted to dispense a measured amount of medicament, an inhalation passage and a mouthpiece, and a push rod adapted to move the metering member from a medicament retaining position to a medicament dispensing position characterised in that the push rod lies in essentially the same plane as the mouthpiece of the inhaler and actuates the metering member in a direction which is coplanar with the mouthpiece of the inhaler.
2. A dry powder inhaler comprising a plurality of metering members adapted to dispense a measured amount of medicament and held on a substantially circular cartridge, an inhalation passage and a mouthpiece, and a push rod adapted to move one of the plurality of metering members from a medicament retaining position to a medicament dispensing position characterised in that the metering member is moved in a substantially radial direction with respect to the cartridge.
3. A dry powder inhaler according to either Claim 1 or Claim 2 characterised in that the medicament metering member comprises a spool and a spool carrier wherein the void between the spool carrier is filled with medicament.
4. A dry powder inhaler according to Claim 2 characterised in that the inhaler is provided with two cartridges.
5. A dry powder inhaler according to Claim 4 characterised in that the cartridges contain the same medicament.
6. A dry powder inhaler according to Claim 4 characterised in that the cartridges contain different medicaments.
7. A dry powder inhaler according to Claim 6 characterised in that the medicaments are fluticasone and salmeterol.

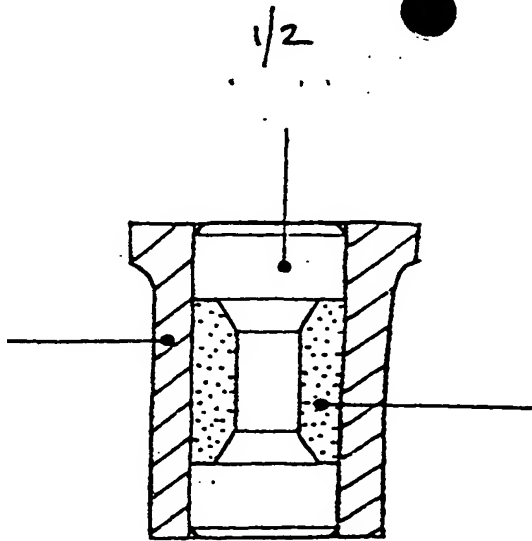


Fig. 1

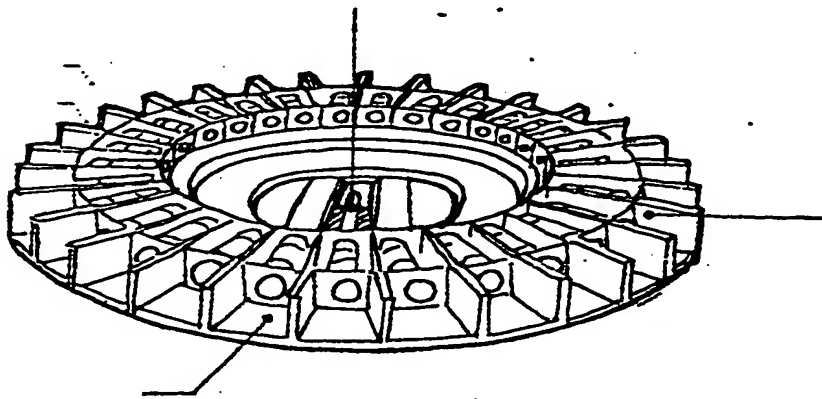


Fig. 2

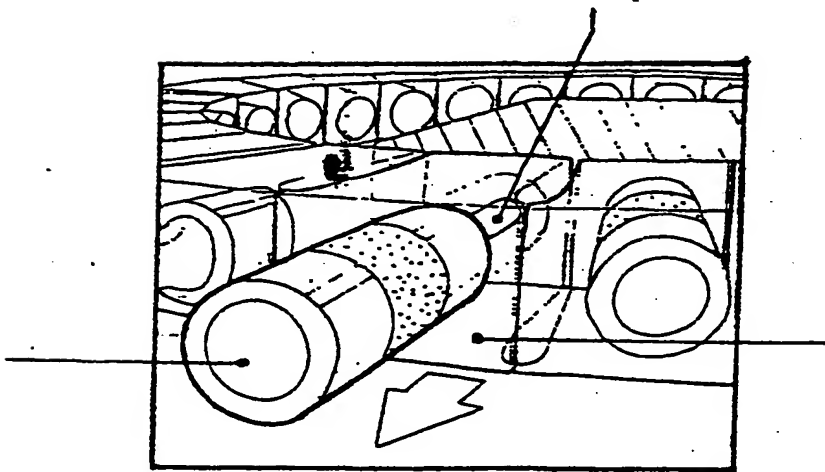


Fig. 3

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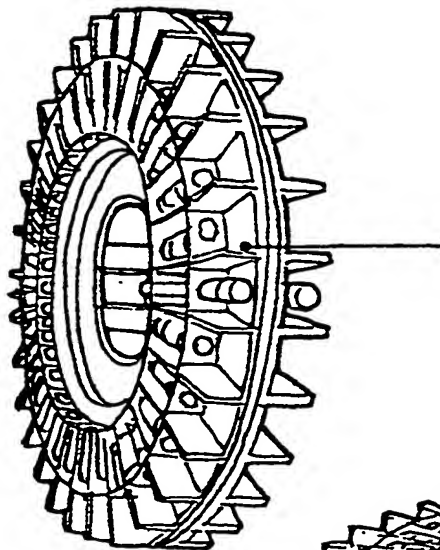


Fig. 4a

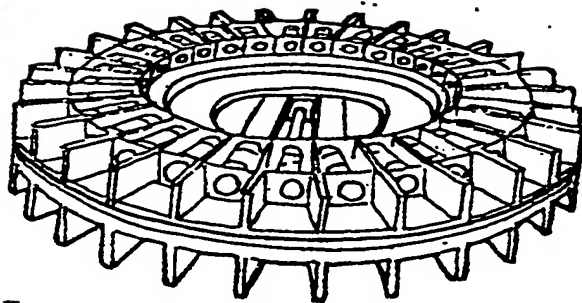
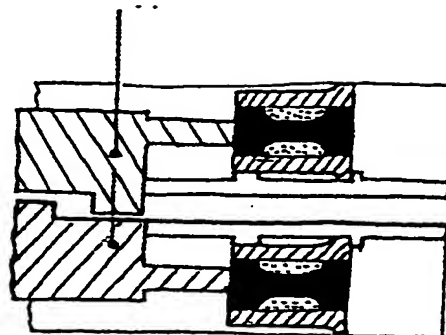
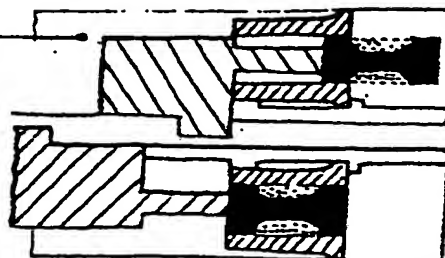


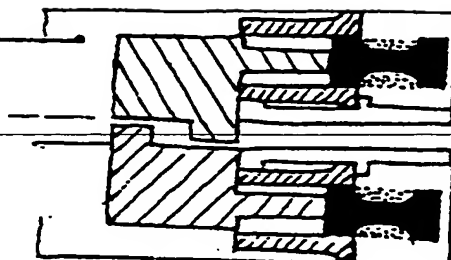
Fig. 4b



a



b



c

Fig 5